

NEW UTILITY PATENT APPLICATION TRANSMITTAL (Small Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
W/C-367552

Total Pages in this Submission

30

TO THE ASSISTANT COMMISSIONER FOR PATENTS

Box Patent Application

Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

A vertical Vortex or laminar flow interactive Bio Media Water Treatment Device

and invented by:

Terry J. Cullinan, Missoula, Montana
Max V. Weiss, Polson, Montana as Co-inventors

If a CONTINUATION APPLICATION, check appropriate box and supply the requisite information:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Enclosed are:

Application Elements

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having _____ pages and including the following:
 - a. ☒ Descriptive Title of the Invention
 - b. ☒ Cross References to Related Applications (if applicable)
 - c. ☒ Statement Regarding Federally-sponsored Research/Development (if applicable)
 - d. ☐ Reference to Microfiche Appendix (if applicable)
 - e. ☒ Background of the Invention
 - f. ☒ Brief Summary of the Invention
 - g. ☒ Brief Description of the Drawings (if drawings filed)
 - h. ☐ Detailed Description
 - i. ☒ Claim(s) as Classified Below
 - j. ☐ Abstract of the Disclosure
3. ☒ Drawing(s) (when necessary as prescribed by 35 USC 113)
 - a. ☒ Formal
 - b. ☐ Informal

Number of Sheets 7

NEW UTILITY PATENT APPLICATION TRANSMITTAL (Small Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.

W/C - 367552

Total Pages in this Submission

Application Elements (Continued)

4. ☒ Oath or Declaration
- a. ☒ Newly executed (*original or copy*) ☐ Unexecuted
- b. ☐ Copy from a prior application (37 CFR 1.63(d)) (*for continuation/divisional application only*)
- c. ☐ With Power of Attorney ☐ Without Power of Attorney
5. ☒ Incorporation By Reference (*usable if Box 4b is checked*)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Computer Program in Microfiche
7. ☐ Genetic Sequence Submission (*if applicable, all must be included*)
- a. ☐ Paper Copy
- b. ☐ Computer Readable Copy
- c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. ☐ Assignment Papers (*cover sheet & documents*)
9. ☒ 37 CFR(B) Statement (*when there is an assignee*)
10. ☐ English Translation Document (*if applicable*)
11. ☐ Information Disclosure Statement/PTO-1449 ☐ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☐ Acknowledgment postcard
14. ☒ Certificate of Mailing
☐ First Class ☒ Express Mail (*Specify Label No.*): _____
15. ☐ Certified Copy of Priority Document(s) (*if foreign priority is claimed*)
16. ☒ Small Entity Statement(s) - Specify Number of Statements Submitted: _____

PATENT APPLICATION TRANSMITTAL LETTER
(Small Entity)

Docket No.
W/C - 367552

TO THE ASSISTANT COMMISSIONER FOR PATENTS

Transmitted herewith for filing under 35 U.S.C. 111 and 37 C.F.R. 1.53 is the patent application of:

Terry James Cullinan, Co-inventor
Max Von Weiss, Co-inventor

For: Bio Septic Systems LLC
P.O. Box 2725, Missoula, MT 59806

Enclosed are:

- ☐ Certificate of Mailing with Express Mail Mailing Label No. *Fed Express 5289109545*
- ☒ (7) seven sheets of drawings.
- ☐ A certified copy of a _____ application.
- ☒ Declaration ☐ Signed. ☐ Unsigned.
- ☐ Power of Attorney
- ☒ Information Disclosure Statement
- ☐ Preliminary Amendment
- ☒ Verified Statement(s) to Establish Small Entity Status Under 37 C.F.R. 1.9 and 1.27.
- ☐ Other:

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	9	- 20 =	0	x \$11.00	\$0.00
Indep. Claims		- 3 =	0	x \$41.00	\$0.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
BASIC FEE					\$395.00
TOTAL FILING FEE					\$395.00

- ☒ A check in the amount of \$395.00 to cover the filing fee is enclosed.
- ☐ The Commissioner is hereby authorized to charge and credit Deposit Account No. _____ as described below. A duplicate copy of this sheet is enclosed.
- ☐ Charge the amount of _____ as filing fee.
- ☐ Credit any overpayment.
- ☐ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

Dated:

3/12/98

Terry James Cullinan
Signature

cc:

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR 1.9(f) AND 1.27 (b)) - INDEPENDENT INVENTOR**

Docket No.
W/C 367552

Serial No.	Filing Date	Patent No.	Issue Date
60/040,690	3/13/97	Pending	

Applicant/ Terry James Cullinan
Patentee: Max Von Weiss

Invention: A Vertical Vortex or Laminar Flow Interactive BioMedia Water Treatment Device

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled above and described in:

- ☐ the specification to be filed herewith.
☒ the application identified above.
☐ the patent identified above.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☐ No such person, concern or organization exists.
☒ Each such person, concern or organization is listed below.

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities (37 CFR 1.27)

FULL NAME	Terry James Cullinan		
ADDRESS	P.O. Box 2725, Missoula, MT 59806		
	<input checked="" type="checkbox"/> Individual	<input type="checkbox"/> Small Business Concern	<input type="checkbox"/> Nonprofit Organization
FULL NAME	Max Von Weiss		
ADDRESS	407 Skidoo Bay, Polson, MT 59860		
	<input checked="" type="checkbox"/> Individual	<input type="checkbox"/> Small Business Concern	<input type="checkbox"/> Nonprofit Organization
FULL NAME	Bio-Septic Systems LLC		
ADDRESS	P.O. Box 2725, Missoula, MT 59806		
	<input type="checkbox"/> Individual	<input checked="" type="checkbox"/> Small Business Concern	<input type="checkbox"/> Nonprofit Organization
	(owned by Applicants)		
FULL NAME			
ADDRESS			
	<input type="checkbox"/> Individual	<input type="checkbox"/> Small Business Concern	<input type="checkbox"/> Nonprofit Organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF INVENTOR Terry James Cullinan

SIGNATURE OF INVENTOR Terry James Cullinan

DATE: 3/12/98

NAME OF INVENTOR Max Von Weiss

SIGNATURE OF INVENTOR _____

DATE: 3/12/98

NAME OF INVENTOR Bio-Septics Systems LLC

SIGNATURE OF INVENTOR Terry J Cullinan, member

DATE: 3/12/98

NAME OF INVENTOR _____

SIGNATURE OF INVENTOR _____

DATE: _____

NAME OF INVENTOR _____

SIGNATURE OF INVENTOR _____

DATE: _____

NAME OF INVENTOR _____

SIGNATURE OF INVENTOR _____

DATE: _____

NAME OF INVENTOR _____

SIGNATURE OF INVENTOR _____

DATE: _____

NAME OF INVENTOR _____

SIGNATURE OF INVENTOR _____

DATE: _____

NAME OF INVENTOR _____

SIGNATURE OF INVENTOR _____

DATE: _____

NAME OF INVENTOR _____

SIGNATURE OF INVENTOR _____

DATE: _____

Full name of sole or first inventor	Terry James Cullinan	3/12/98
Sole or first inventor's signature	<i>Terry James Cullinan</i>	Date
Residence	2201 South 3rd West #8, Missoula, MT 59806	
Citizenship	U.S. Citizen	
Post Office Address	P.O. Box 2725, Missoula, MT 59806	

Full name of second inventor, if any	Max Von Weiss	3/12/98
Second inventor's signature		Date
Residence	407 Skidoo Bay, Polson, MT 59860	
Citizenship	U.S. Citizen	
Post Office Address	N/A	

Full name of third inventor, if any		
Third inventor's signature		Date
Residence		
Citizenship		
Post Office Address		

Full name of fourth inventor, if any		
Fourth inventor's signature		Date
Residence		
Citizenship		
Post Office Address		

Docket No.

W/C 367552

Declaration For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

A Vertical Vortex or Laminar Flow Interactive BioMedia Water Treatment Device

the specification of which

(check one)

☒ is attached hereto.

☐ was filed on _____ as United States Application No. or PCT International Application Number _____ and was amended on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)			Priority Not Claimed
_____ on file	_____ on file	_____ 06/13/97	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
_____	_____	_____	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
_____	_____	_____	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

<u>60/040,690</u>	<u>3/13/97</u>
(Application Serial No.)	(Filing Date)
 <u> </u>	 <u> </u>
(Application Serial No.)	(Filing Date)
 <u> </u>	 <u> </u>
(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, CFR Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

<u>60/040,690</u>	<u>3/13/97</u>	<u>Pending</u>
(Application Serial No.)	(Filing Date)	(Status)
		(patented, pending, abandoned)
 <u> </u>	 <u> </u>	 <u> </u>
(Application Serial No.)	(Filing Date)	(Status)
		(patented, pending, abandoned)
 <u> </u>	 <u> </u>	 <u> </u>
(Application Serial No.)	(Filing Date)	(Status)
		(patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor	Terry James Cullinan	3/12/98
Sole or first inventor's signature	<i>Terry James Cullinan</i>	Date
Residence	2201 South 3rd West #8, Missoula, MT 59806	
Citizenship	U.S. Citizen	
Post Office Address	P.O. Box 2725, Missoula, MT 59806	

Full name of second inventor, if any	Max Von Weiss	3/12/98
Second inventor's signature		Date
Residence	407 Skidoo Bay, Polson, MT 59860	
Citizenship	U.S. Citizen	
Post Office Address	N/A	

Full name of third inventor, if any		
Third inventor's signature		Date
Residence		
Citizenship		
Post Office Address		

Full name of fourth inventor, if any		
Fourth inventor's signature		Date
Residence		
Citizenship		
Post Office Address		

PROVISIONAL APPLICATION
FILING RECEIPT



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
ASSISTANT SECRETARY AND COMMISSIONER
OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NUMBER	FILING DATE	FIL FEE REC'D	ATTORNEY DOCKET NO.	DRWGS
60/040,690	03/13/97	\$75.00	W/C-367552	6

MAX V WEISS
415 NORTH HIGGINS AVENUE
MISSOULA MT 59802

Receipt is acknowledged of this Provisional Application. This Provisional Application will not be examined for patentability. Be sure to provide the PROVISIONAL APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please write to Box Provisional Application within 10 days of receipt. Please provide a copy of the Provisional Application Filing Receipt with the changes noted thereon. This Provisional Application will automatically be abandoned twelve (12) months after its filing date and will not be subject to revival to restore it to pending status beyond a date which is after twelve (12) months from its filing date.

Applicant(s). MAX V. WEISS, MISSOULA, MT; TERRY J. CULLINAN, MISSOULA, MT.

FOREIGN FILING LICENSE GRANTED 06/13/97

* SMALL ENTITY *

TITLE

VERTICAL VORTEX OR LAMINAR FLOW INTERACTIVE BIOMEDIA PRETREATMENT
DEVICE

0604165-031397

PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (b)(2).

Docket Number		W/C 367552		Type a plus sign (+) inside this box →	+
INVENTOR(s)/APPLICANT(s)					
LAST NAME	FIRST NAME	MIDDLE NAME/INITIAL	RESIDENCE (CITY AND EITHER STATE OR FOREIGN COUNTRY)		
WEISS	MAX	V	415 NORTH HIGGINS AVE. MISSOULA, MT. 59802		
CULLINAN	TERRY	J	415 NORTH HIGGINS AVE. MISSOULA, MT. 59802		
TITLE OF THE INVENTION (250 characters max)					
VERTICAL VORTEX OR LAMINAR FLOW INTERACTIVE BIOMEDIA PRETREATMENT DEVICE					
CORRESPONDENCE ADDRESS (including country if not United States)					
415 NORTH HIGGINS AVE, MISSOULA, MONTANA 59802					
ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification	Number of Pages	1	<input checked="" type="checkbox"/> Small Entity Statement		
<input checked="" type="checkbox"/> Drawing(s)	Number of Sheets	36	<input type="checkbox"/> Other (specify)		
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)					
<input checked="" type="checkbox"/> A check or money order is enclosed to cover the filing fees				FILING FEE AMOUNT (\$)	\$75.00
<input type="checkbox"/> The Commissioner is hereby authorized to charge filing fees and credit Deposit Account Number:					

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are:

Respectfully submitted,

SIGNATURE

Max Weiss

Date

3/5/97

TYPED or PRINTED NAME

MAX WEISS

REGISTRATION NO.

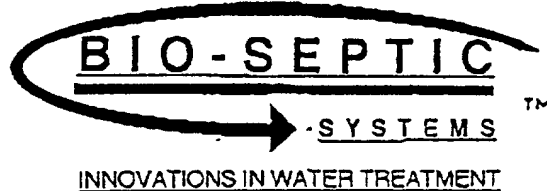
(if appropriate)

☐

Additional inventors are being named on separately numbered sheets attached hereto

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, DC 20231.



DISCLOSURE DOCUMENT NO.

367552

FILING FEE: \$10.00

RETAINED FOR 2 YEARS

THIS IS NOT A PATENT APPLICATION

415 NORTH HIGGINS AVENUE MISSOULA, MONTANA 59802 • PHONE: (406) 721-3000 EXT. 1190 / FAX: (406) 721-5912

DISCLOSURE OF INVENTIONTITLE: A Bio-reactive Grease and Oil SeparatorPROBLEM SOLVED BY INVENTION:

Food service establishments and industrial processing facilities generate grease, oil, sugars, starches and other contaminants in their wastewater. Grease and oil are major contributors to blockages and backups in drains and mains, unpleasant odors, costly pumping of interceptor tanks and in extreme cases, excavation of mains, drains and tanks.

Current treatment systems have shortcomings related to incomplete separation and retention. Current treatment systems concentrate mainly on separation and do not address the subsequent problem of disposal of the separated substances.

The suggested invention addresses the complete problem presented by objectionable substances through the application of fluid mechanics and bio-technology.

DESCRIPTION OF THE INVENTION:

The proposed invention consists of a superpermeable interactive membrane (see attached diagram) which as a result of its unique geometric configuration, produces a predictable fluid flow conducive to the release of suspended materials and the transportation of the substances to a companion geometric configuration designed to maximize surface area, regulate laminar flow within vertical surfaces to encourage the development of and maximize the production of a live biofilm and to maintain a beneficial environment for bio-oxidation. The membrane/substrate/containment may be configured to a multitude of applications appropriate to each treatment task. The application depicted (see diagram) is intended for greywater remediation. While the preferred application of the elements of the suggested invention are interactive, each element may be applied to fluid treatment independently.

VERIFICATION OF INVENTION:

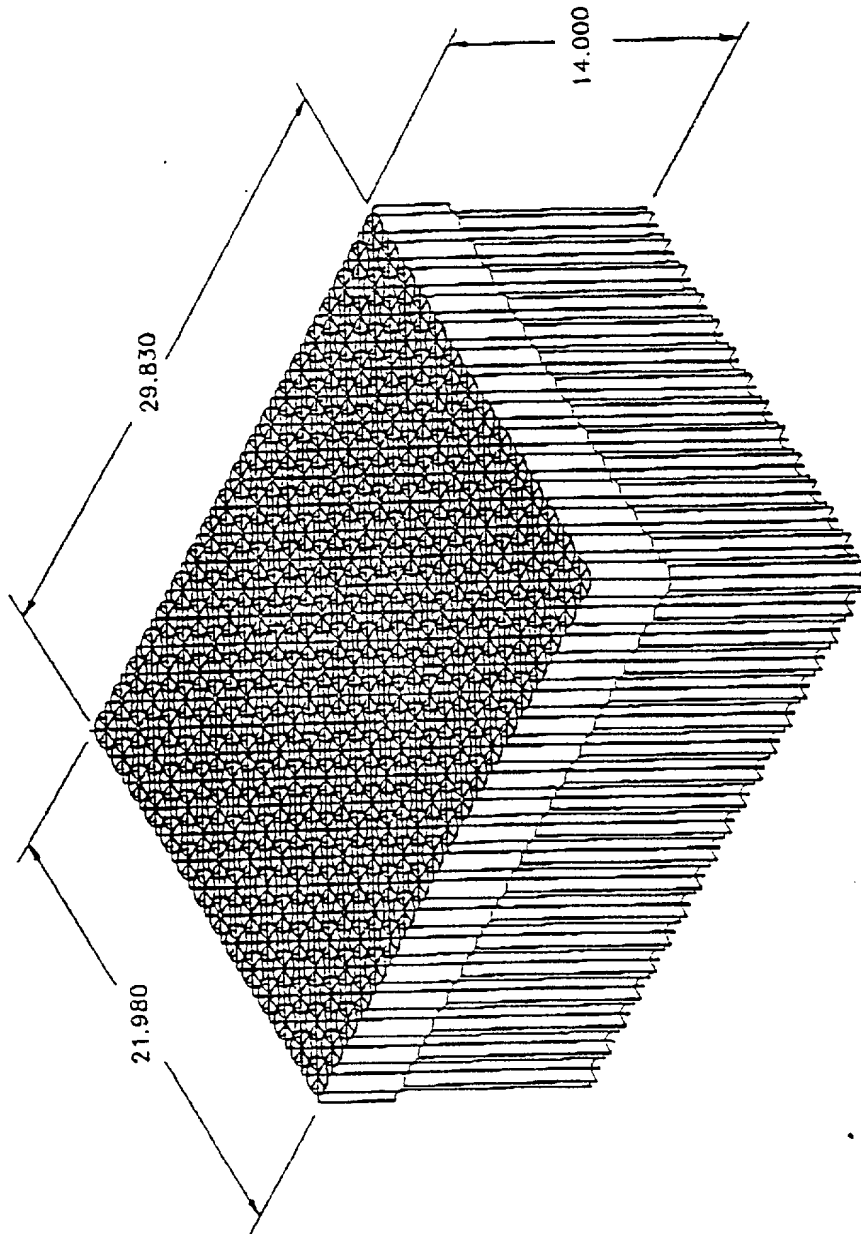
Mat Weiss
415 N. Higgins Ave
Missoula, MT. 59802
For: Bio-Septic Systems
Inventor

Terry J. Cullman
Box 2725
Missoula, MT 59806
For: Bio-Septic Systems
Inventor

STATE OF MONTANA, County of Missoula;

On this 21 day of December, 1994, before me, the undersigned Notary Public personally appeared the above named persons who are known to be the persons whose names are subscribed to the foregoing DISCLOSURE OF INVENTION and who acknowledged to me that they executed the same and if signed on behalf of a corporation, personally known to me to be the officers of said corporation as stated and acknowledged to me that such corporation executed the same.

Notary Public
Notary Public for the State of Montana
Residing at _____
My Commission expires: _____



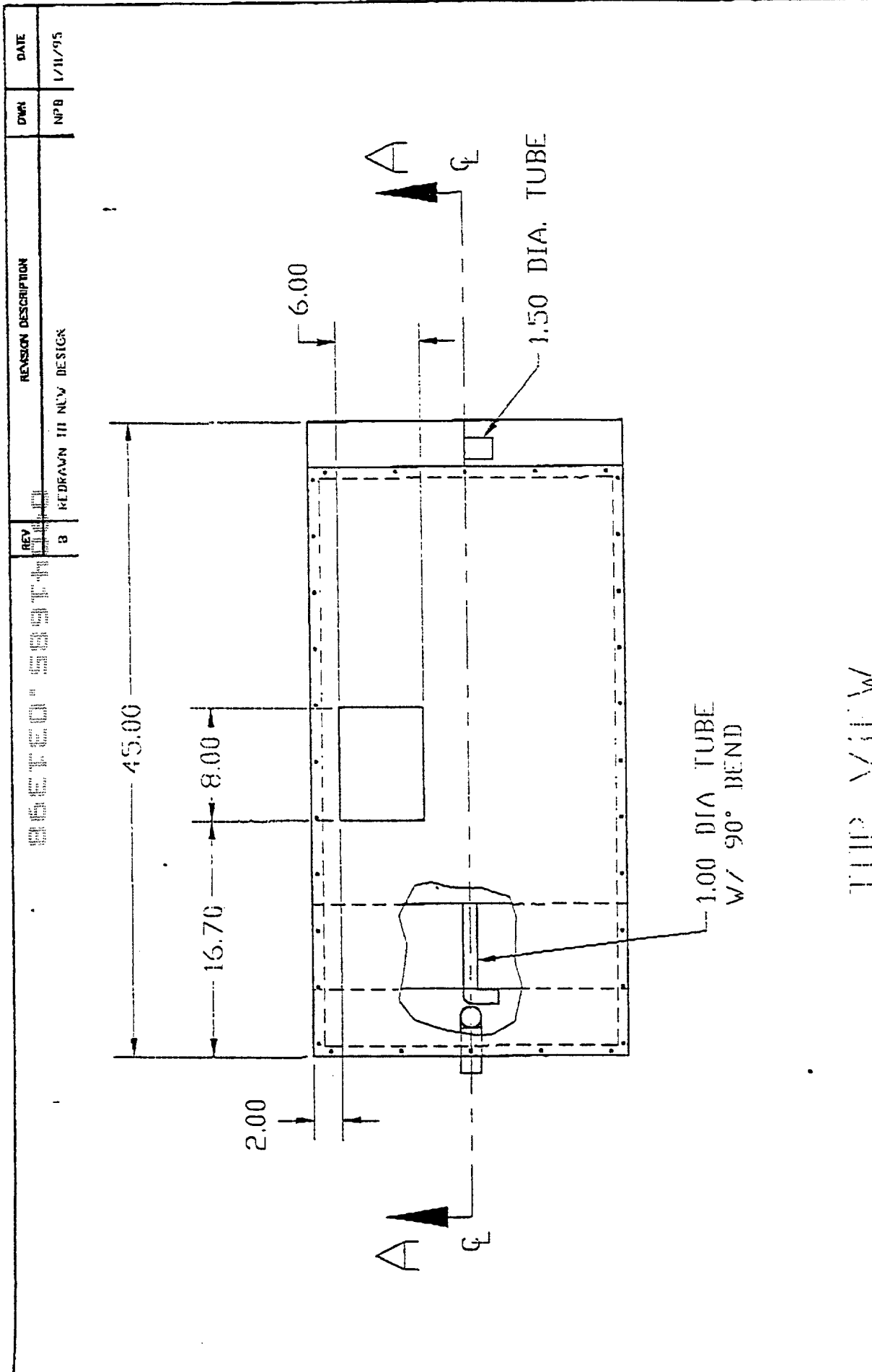
BIO-SEPTIC SYSTEMS

TOLERANCES UNLESS NOTED:
DIMENSIONS ARE IN INCHES
XX ±.03
XXX ±.000
REMOVE ALL SHARP EDGES

DRAWN FOR: NPI NORTHERN PLASTICS INC.

BIO-REACTIVE GREASE SEPARATOR
TITLE: PROPOSED ASSY.

DATE:	DATE:	REV	REV
SEE NOTES	DATE:	BID0001A	AJ
REFERENCE NO:	ENGINEER:	SCALE:	SCALE:
DRAWING SIZE: C	APPROVED:	NONE	SHEET 1 OF 1

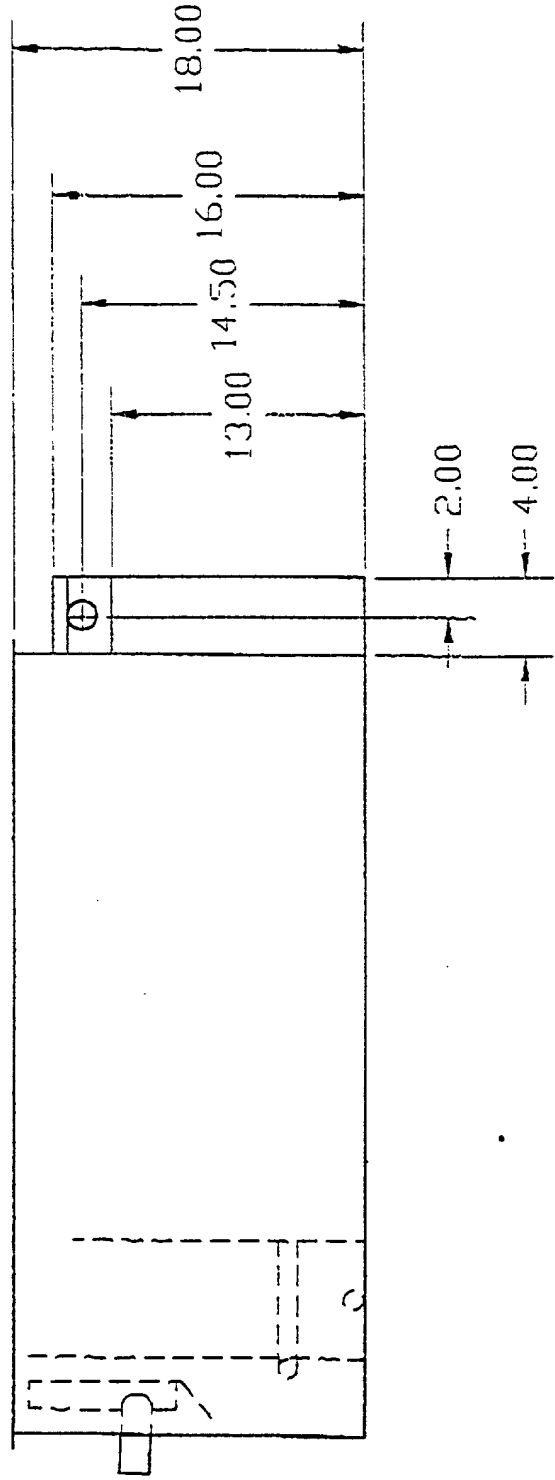


BIO-SEPTIC SYSTEMS	
NPI NORTHERN PLASTICS INC.	
DRAWN FOR:	
BIO-REACTIVE GREASE SEPARATOR	
TITLE: PROPOSED ASSY.	
TOLERANCES UNLESS NOTED: DIMENSIONS ARE IN INCHES .XX ± .03 .XXX ± .010 REMOVE ALL SHARP EDGES	
NATURAL: SCT. NOTES	
REFERENCE NO.:	
DRAWING NO.:	
DATE: 1/9/95	
DRAWN: NB	
ENGINEER:	
APPROVE:	
DRAWING NUMBER: BIO001	
SCALE: 1:1	
SHEET 1 OF 4	

SECRET

REV	REVISION DESCRIPTION	DWN	DATE
8	RE DRAWN TO NEW DESIGN	NPD	1/11/95

TOP

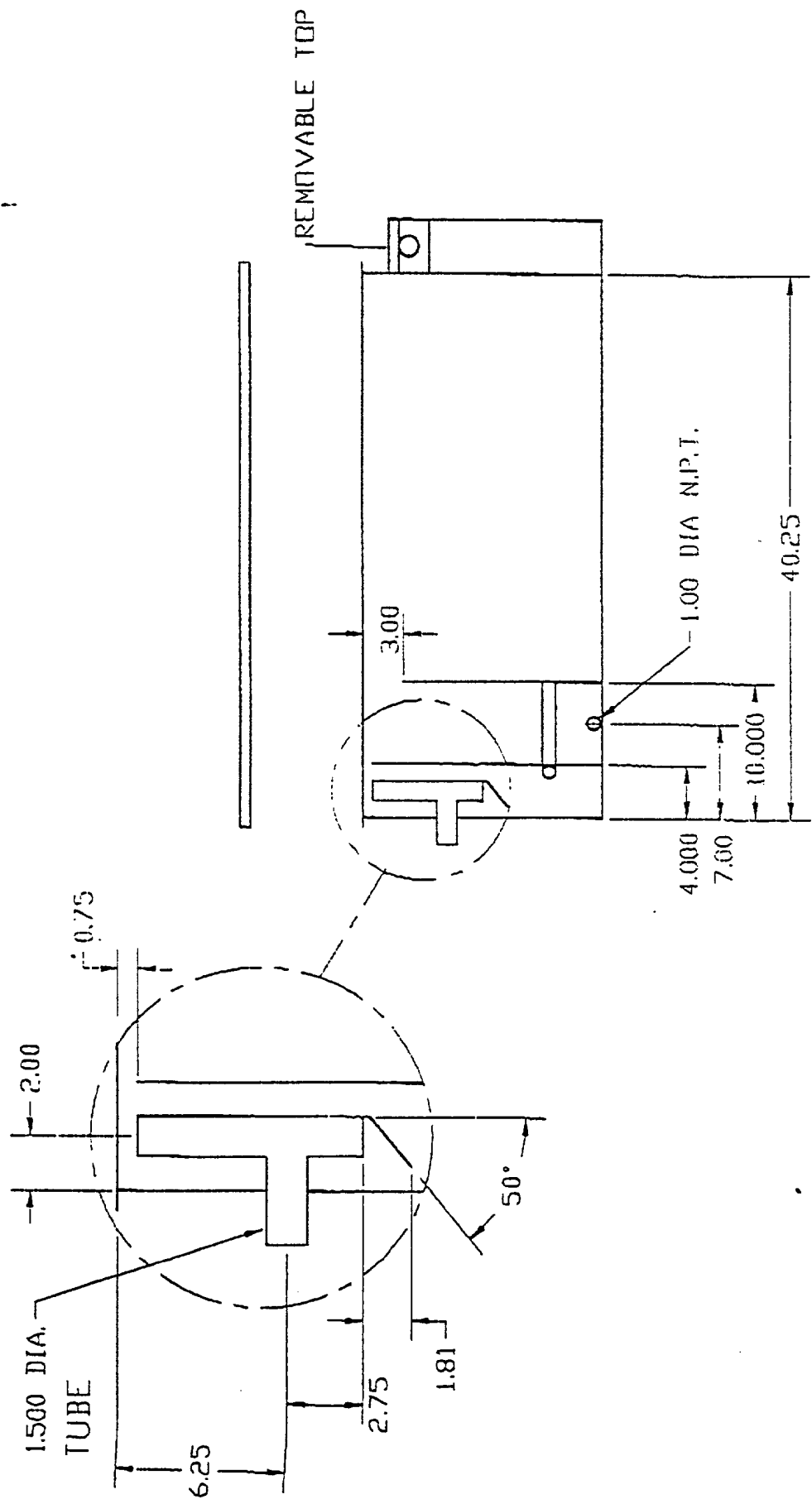


BACK VIEW

BIO-SEPTIC SYSTEMS

TOLERANCES UNLESS NOTED: DIMENSIONS ARE IN INCHES XX ±.03 XXX ±.010		DRAWN FOR: NPI NORTHERN PLASTICS INC.	
REMOVE ALL SHARP EDGES		TITLE: BIO-REACTIVE GREASE SEPARATOR PROPOSED ASSY.	
NATURAL S.I. NOT'S		DATE: 1/9/95	DRAWING NUMBER: REV B10001 B
REFERENCE NO.		ENGINEER:	SCALE: 1:1
DRAWING NO.		APPROVED:	SHEET 2 OF 4

REV	REVISION DESCRIPTION	DWN	DATE
B	REDRAWN TO NEW DESIGN	NPJ	1/11/95



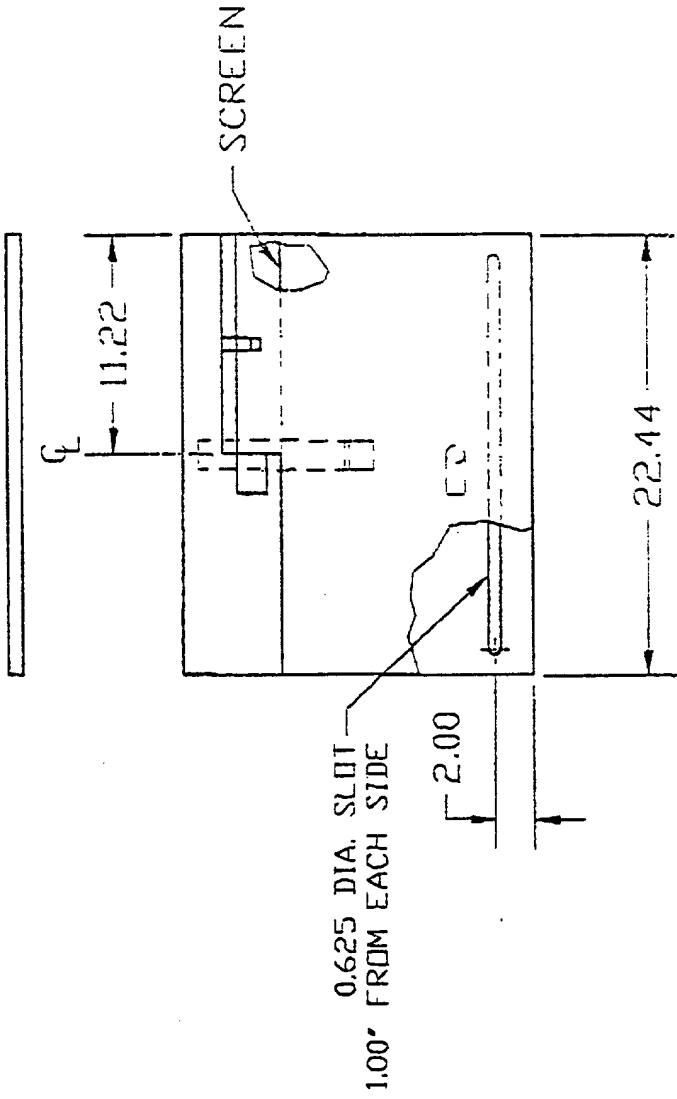
SECTION A-A

BIO-SEPTIC SYSTEMS

TOLERANCES UNLESS NOTED: DIMENSIONS ARE IN INCHES XX ±.03 XXX ±.010 REMOVE ALL SHARP EDGES	DRAWN FOR: NPJ NORTHERN PLASTICS INC.	
	TITLE: BIO-REACTIVE GREASE SEPARATOR PROPOSED ASSY.	
MATERIAL: SEE NOTE 1	DATE: 1/9/95	DRAWING NUMBER: B10001
REFERENCE NO.:	ENGINEER:	SCALE: 1:1
DRAWING 3/1:	APPROVED:	SHEET 1 OF 4

36" T.E.O. SEPTIC

REV	REVISION DESCRIPTION	OWN	DATE
B	REDRAWN TO NEW DESIGN	NPD	1/11/95



SIDE VIEW

BIO-SEPTIC SYSTEMS

TOLERANCES UNLESS NOTED: DIMENSIONS ARE IN INCHES XX ±.03 XXX ±.010 REMOVE ALL SHARP EDGES		NPI NORTHERN PLASTICS INC. DRAWN FOR: BIO-REACTIVE GREASE SEPARATOR PROPOSED ASSY.	
NATIONAL:	DATE: 1/9/95	DRAWING NUMBER: 80001	REV: B
SER. NO.:	ENGINEER:	SCALE: 1/1	SHEET 4 OF 4
DRAWING NO.:	APPROVED:		

SPECIFICATION

TITLE

Vertical Vortex or Laminar Flow Interactive Biomedia Water Treatment Device

REFERENCE

Provisional Patent Application, Application Number 60/040,690; Filing Date 3/13/97; Docket Number W/C 367552

SUMMARY OF INVENTION

A process for treating water containing organic and/or inorganic matter. Consisting of inoculating an input flow with prescribed micro-organisms or mixtures thereof in a chamber containing a media designed to effect separation through gravity and coalescence in flow induced vortices. The media additionally serves to provide hydromechanically enhanced substance retention and surface area, upon which, the introduced micro-organisms form a biofilm for the purpose of matter retention and/or decomposition. The media may be placed in a tangential or parallel orientation to the flow of input water.

DESCRIPTION

An interactive biomedia constructed from plastic or other application suitable material with an eight vaned inner structure and a finned cylindrical outer structure, both of varying length, depending upon requirements is placed in containments of varying configuration as required.

Fluid flow tangential to the vane structure induces vortices to form in the fluid. The low pressure area in the center of the vortices facilitates particle to particle collision coalescence and greater separation efficiency of suspended matter with buoyant material being retained in the upper cylindrical portion of the media and settleable material collecting at the base. Retained organic material can then be decomposed by biofilm formed on the surface of the media.

0504165-031999

Fluid flow parallel to the media surfaces produces continuous contact between the fluid and surface area of the media which, when covered with a biofilm, effects more efficient mass transfer of an organic or inorganic substrate within the biofilm thereby assisting retention, decomposition and/or biotransformation.

CLAIMS

1. A process for treating water containing organic matter by separating the organic matter from water by induced vertical vortices produced by interaction between flowing water and the eight vaned media structure.
2. A process for treating water containing inorganic matter by separating the inorganic matter from water by induced vertical vortices produced by interaction between flowing water and the eight vaned media structure.
3. A process for decomposing organic matter separated from water by induced vertical vortices produced by interaction between flowing water and the eight vaned media structure by introduced micro-organisms forming a biofilm on the media structure.
4. A process for retaining and biochemically transforming inorganic matter separated from water by induced vertical vortices produced by interaction between flowing water and the eight vaned media structure.
5. A process for decomposing organic matter flowing in water parallel to the eight vaned and cylindrical media structure surfaces by introduced micro-organisms forming a biofilm on the media structure.
6. A process for retaining and biochemically transforming inorganic matter flowing in water parallel to the eight vaned and cylindrical structure surfaces by introduced micro-organisms forming a biofilm on the media structure.

CONTINUATION OF LIST OF DESCRIPTIONS

7. A process of application of this technology to blackwater [sewage] Bio-Septic Systems, LLC entered into an agreement to test blackwater remediation with the Environmental Protection Agency and Montana State University\Center for BioFilm Technology. *See*; Drawing of blackwater tank attached.

8. Adapted membrane technology for removal of heavy metals.

9. Membrane technology used without bacteriological charge for separation for differentiating fluids. Tested and certified on September 6, 1996 under Test No. 96-07-02895 by Plumbing and Draining Institute. Certificate and test specifications attached.

Industrial Testing Laboratories, Inc.

(Name of Independent Testing Laboratory)

2350 Seventh Blvd., St. Louis, MO 63104

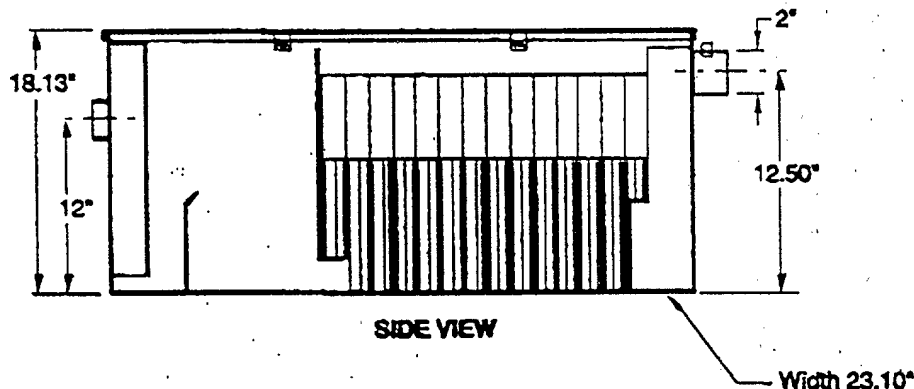
(Street, City, State and Zip Code)



GREASE INTERCEPTOR CERTIFICATE

This is to certify that a production Grease Interceptor, Model No. 8970-35, manufactured by, or for Jay R. Smith Mfg. Co., which conforms to the drawings and dimensions illustrated herein, has been tested by us as of this date in accordance with the testing procedure established by the Plumbing and Drainage Institute, in P.D.I. Standard PDI-G101 which includes a vented inlet flow control, and has qualified for Certification at an average flow rate of 35 gallons per minute and 70 pounds of grease retention capacity rating, while maintaining an average efficiency of 90% or more and incremental efficiency of 80% or more, which are the acceptable levels in such Standard. Units with an automatic grease removal device are tested with it inoperative.

The results of tests conducted on this unit are applicable to this unit only. Use of this data and/or reference to the Plumbing and Drainage Institute or The Industrial Test Laboratories Inc. in connection with purported certification by any other means than testing to the applicable standard without the consent of the Plumbing and Drainage Institute will constitute a breach of the relevant certification Mark License Agreement with the Plumbing and Drainage Institute.



(Drawing, dimensions and description)

Drawing cross-sectioned in a plane perpendicular to the cover passing through the inlet and outlet ports with all internal components in place. Length, width and height are noted.

Subscribed and sworn (or affirmed) by me at

St. Louis, MO

this 6th day of Sept. 19 96

Notary Public William A. Rouse

My commission expires June 22, 2000

The statements made herein are certified to be true and correct.

Name Angela Becker

Title Mechanical Engineer

Date September 6, 1996

Test No. 96-07-02895

INDUSTRIAL TESTING LABORATORIES, INC
2350 S. SEVENTH STREET ST LOUIS, MO 63104

Report No.96-07-02895

Standard PDI-G101 Grease
Interceptor Rating Test Form #1

GREASE INTERCEPTOR TEST

INTERCEPTOR: Jay R. Smith Model No. 8970-35										No. 1		At: ITL Date: 8/19/96	
Dlm: 48" x 23.1" x 18.1"										Observers: GWE/JW			
Compartment Data Capacity				Test Vehicle				Flow Control Data					
No. 1 35.0 Gals.				Sp. Gr. 0.876 @ 155 °F				Smith #11110					
No. 2 35.0 Gals.				Viscos. 89.7				Location: on piping					
Calibrated Drainage				Test Temp. 150-160° F				Position: horizontal					
Separate No. 1 27.7 GPM				Water Source: St. Louis City				Flow Direction: vertical					
No. 2 27.2 GPM				pH 9.3				Office: 1.56"					
Simultaneous No. 1 35.4 GPM				Test Temp. 150-160° F				Air Inake: 1.25"					
& Gauged On No. 2 35.0 GPM								Max. Head: 26.0"					
Service		Compartment		Test Vehicle In lbs.		Accumulated		Ave. Eff. "A" %					
Incr. No.	Test	Clear	Time min/sec.	Rate GPM	Added	Skim	Retain	Added	Skim	Retain			
1	1	2	1:56	34.4	7.00	0.00	6.99	7.00	0.00	7.00	100.0		
2	2	1	1:54	35.0	7.00	0.01	6.98	14.00	0.01	13.99	99.9		
3	1	2	1:56	34.8	7.00	0.04	6.96	21.00	0.05	20.95	99.8		
4	2	1	1:53	35.4	7.00	0.03	6.97	28.00	0.08	27.92	99.7		
5	1	2	1:56	34.6	7.00	0.04	6.96	35.00	0.12	34.88	99.6		
6	2	1	1:53	35.4	7.00	0.04	6.96	42.00	0.16	41.84	99.6		
7	1	2	1:54	35.0	7.00	0.03	6.97	49.00	0.19	48.81	99.6		
8	2	1	1:53	35.4	7.00	0.04	6.98	56.00	0.23	55.77	99.6		
9	1	2	1:55	34.8	7.00	0.03	6.97	63.00	0.26	62.74	99.6		
10	2	1	1:53	35.4	7.00	0.02	6.98	70.00	0.28	69.72	99.6		
11	1	2	1:54	35.0	7.00	0.04	6.98	77.00	0.32	76.68	99.6		
12	2	1	1:54	35.0	7.00	0.03	6.97	84.00	0.35	83.65	99.6		
13	1	2	1:55	34.6	7.00	0.03	6.97	91.00	0.38	90.62	99.6		
14	2	1	1:54	35.0	7.00	0.02	6.98	98.00	0.40	97.60	99.6		
15	1	2	1:54	35.0	7.00	0.03	6.97	105.00	0.43	104.57	99.6		
16	2	1	1:53	35.4	7.00	0.05	6.96	112.00	0.48	111.52	99.6		
17	1	2	1:55	34.6	7.00	0.04	6.98	119.00	0.52	118.48	99.6		
18	2	1	1:54	35.0	7.00	0.05	6.96	126.00	0.57	125.43	99.5		
19	1	2	1:54	35.0	7.00	0.04	6.96	133.00	0.61	132.39	99.5		
20	2	1	1:54	35.0	7.00	0.04	6.96	140.00	0.65	139.35	99.5		
Summary & Adjusted Results:													
(1) Total Skim 10.81 lbs.													
(2) Actual Retained 240.76 lbs.													
(3) Total Accd. 251.56 lbs.													
(4) Total Added 252.00 lbs.													
Loss 0.44%													
Loss 0.2%													
Ave. Eff. "A" = $\frac{\text{Line 4} - \text{Line 1}}{\text{Line 4}} = 95.7\%$													
EFF. "B" = $\frac{\text{Line 2}}{\text{Line 3}} = 95.7\%$													
Breakdown: Increment No. 34													
Amount Retained: 236.30 lbs.													
Incr. Eff. "A" 95.4% "B" 95.4%													
Avg. Eff. "A" 99.3% "B" 99.3%													
Certificate Rating: PASS													
35 GPM 70 lbs. cap.													

14067215912 P.01
TO
14067215912 P.01
406-721-5912
WAX CO: VILLAX WELLS
from: M. Daniel

090441635 031396

INDUSTRIAL TESTING LABORATORIES, INC.

Report No. 96-07-02895

Page 2

GREASE INTERCEPTOR TEST

Incr. No.	Compartment Service		Compartment Drainage		Incremental				Accumulated				Ave. Eff. "A" %	Notes:
	Test	Clear	Time min/sec.	Rate GPM	Test Vehicle in lbs.		Eff "A" %	Test Vehicle in lbs.						
					Added	Skim		Retain	Added	Skim	Retain			
21	1	2	1:55	34.6	7.00	0.04	6.96	99.4	147.00	0.69	146.31	89.5	Notes: Drainage gauged on clear compartment. Tabulated "Amounts Retained" & "Efficiency", "Assumes" No Loss Tabulated "Skim Amounts" include pro-rata addition for skim reclaimed from skim tank after chilling. "Actual Retained" established by weight after completion of test. All weights taken after dewatering by separatory funnel & chilling.	
22	2	1	1:53	35.4	7.00	0.05	6.95	99.3	154.00	0.74	153.26	89.5		
23	1	2	1:54	35.0	7.00	0.04	6.96	99.4	161.00	0.78	160.22	89.5		
24	2	1	1:53	35.4	7.00	0.06	6.94	99.1	168.00	0.84	167.16	89.5		
25	1	2	1:55	34.6	7.00	0.04	6.96	99.4	175.00	0.88	174.12	89.5		
26	2	1	1:53	35.4	7.00	0.05	6.95	99.3	182.00	0.93	181.07	89.5		
27	1	2	1:54	35.0	7.00	0.05	6.95	99.3	189.00	0.98	188.02	89.5		
28	2	1	1:54	35.0	7.00	0.04	6.96	99.4	196.00	1.02	194.98	89.5		
29	1	2	1:55	34.6	7.00	0.05	6.95	99.3	203.00	1.07	201.93	89.5		
30	2	1	1:54	35.0	7.00	0.03	6.97	99.6	210.00	1.10	208.90	89.5		
31	1	2	1:54	35.0	7.00	0.10	6.90	98.6	217.00	1.20	215.80	89.4		
32	2	1	1:53	35.4	7.00	0.09	6.91	98.7	224.00	1.29	222.71	89.4		
33	1	2	1:55	34.6	7.00	0.09	6.91	98.7	321.00	1.38	229.62	89.4		
34	2	1	1:53	35.4	7.00	0.32	6.68	95.4	238.00	1.70	236.30	89.3		
35	1	2	1:54	35.0	7.00	3.83	3.17	45.3	245.00	6.53	239.47	97.7		
36	2	1	1:54	35.0	7.00	6.28	1.72	24.6	252.00	10.81	241.19	95.7		

Average or Total 1:54 35.0 252.00 10.81 241.19

The results of tests conducted on this unit are applicable to this unit only. Use of this data and/or reference to the Plumbing & Drainage Institute or Industrial Testing Laboratories, Inc. in connection with purported certification by any other means than testing to the applicable standard without the consent of the Plumbing & Drainage Institute will constitute a breach of the relevant certification Mark License Agreement with the Plumbing & Drainage Institute.

090441585 034398

EXECUTIVE SUMMARY

Bio-Septic Systems, Inc., a new environmental technology firm in Missoula, MT, seeks financing from the Montana Science and Technology Alliance to commercialize an innovative bio-reactor system for treating and remediating wastewaters. As current wastewater-treatment systems grow increasingly obsolete, Bio-Septic Systems has found a new and cost-effective method for reducing non-toxic wastewater substances to levels that are environmentally responsible and in full compliance with--indeed, even exceed--federal, state, and municipal standards.

Description of Technology

This new technology, preliminary prototypes of which have already been developed, consists of a bio-reactive separator system that hydro-mechanically separates grease, oil and other non-toxic pollutants, and then biodegrades these substances into natural elements such as water and CO₂. Relying on concepts and research from England, Australia, Germany and Japan, it differs from other current U.S. technologies in that it breaks down and disposes of undesired liquids and waste particles by utilizing an interactive membrane system in combination with the presence of organically produced enzymes and bacteria.

The key element in this membrane system is a super-permeable ^{CONFIGURATION} polymer that employs flow-differentiation and displacement--rather than valves and pumps--to wet the verticle surfaces and maintain an on-going and viable biofilm in an aerobic atmosphere. The action of the membrane, together with the biofilm, enables interdependent strains of ~~the organic materials~~ ^{microbes} to arrange themselves in close proximity to each other, thereby maximizing their digestive efficiency and remediative capacity.

The simplicity of this technology, together with the enzymes and bacteria, gives this bio-reactor system a significant competitive advantage over other U.S. technology in the field.

Potential for Commercial Success

The prospects for commercial success are very good. The market for this new technology comprises all mid- and large-sized restaurants; all institutional kitchens; all industrial plants and manufacturing sites that emit grease, oil, chemicals, and non-toxic liquids; and all garages and truckstops. Key benefits are that Biospetic's system is installed at the source where gray- and black-water are first emitted, and that it is easy to manufacture and maintain. Additionally, it is significantly ~~is~~ less expensive than existing processes. Preliminary inquiries with the Environmental Protection Agency, managers of wastewater treatment facilities, and major national manufacturers and distributors of restaurant equipment, among others, indicate this technology will be well received when it becomes available.

Management Team

The management team consists of persons with training and experience in engineering, hydrology, environmental sciences, corporate management and finance. The key team members are:

05041635-031398

Commercially

- The company relies extensively on outside consultants for specialized expertise. Directors of marketing and manufacturing will be hired as soon as possible.

The company's 5-year business plan foresees activities in the following areas, managed in accordance with principles of carefully planned growth:

- A commercially viable model of the prototype designs, together with complementary product lines, will be available for distribution to representatives of other manufacturers by March, 1995 (see Items I to II). Licensing agreements and initial sales will provide us the short-term cash flow on which the business will be built. Preliminary discussions with distributors indicate an active interest concerning licensing agreements in several U.S. and foreign markets.

Capital Requirements and Additional Funding Sources

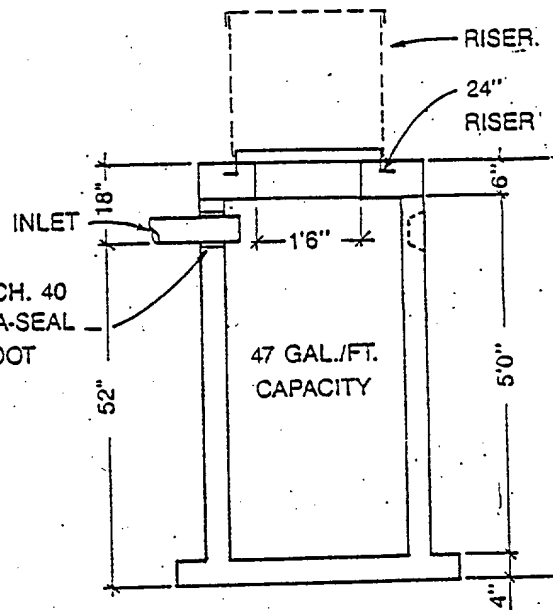
An estimated \$250,000 in start-up funds is needed to refine the prototypes, to manufacture and distribute the company's final products, and to continue research into other applications. As soon as this capital becomes available, we will begin aggressive marketing of the product and accompanying services and devices. Further funding will be generated through customer commitments, licensed distributors, traditional debt sources and private investors. Ultimately, the company hopes to qualify for public financing through a registered stock offering.



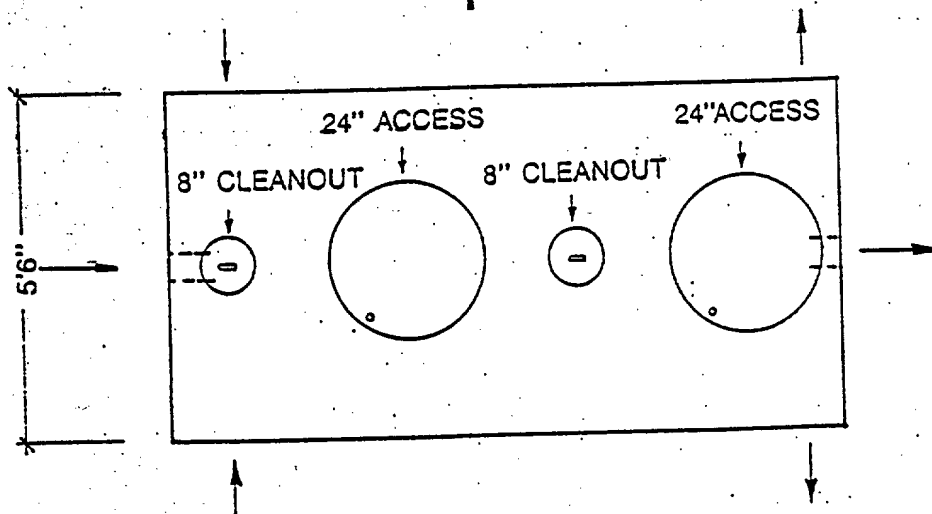
section

OPTIONAL
S.T.E.P.S. TANK

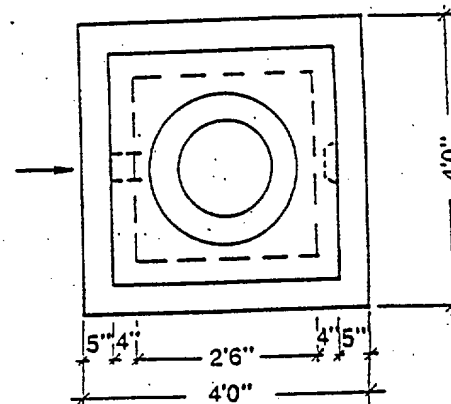
section?



top view



top view



- CAST WITH TRAFFIC RATED LIDS.
—ALSO AVAILABLE IN 2000 GALLON TOTAL CAPACITY,

March 4, 1998

Patent and Trademark Office
Washington, D.C. 20231

RE: Application No. 60\040,690
Docket No. W\C367552
Our File No. 7015

Dear Patent Office:

This letter is submitted with the enclosed New Utility Patent Application Transmittal, to explain why the signatures of co-inventor, Max V. Weiss, are not on this application at this time. On March 3, 1998, Mr. Weiss caused to be delivered a proposed Patent Application with the request of Mr. Cullinan's signature as co-inventor. A review of this proposed Application revealed many deficiencies, including but not limited to: out-of-date forms, insufficient filing fee amount, and incomplete supporting documents. Mr. Cullinan sought the limited assistance which was then available to correct the deficiencies and create the now enclosed New Utility Patent Application Transmittal. Mr. Weiss failed to respond to repeated requests for assistance in the necessary corrections. To meet the filing deadline of March 13, 1998, Mr. Cullinan prepared the enclosed Application and supporting documents, and retains the co-inventor status of Mr. Weiss. Upon further review, a continuing in-part application may be submitted.

The lack of cooperation from Mr. Weiss may be attributed to an on-going dispute between these co-inventors, as well as the lawsuit they have filed against each other in State Court. *See*; Copy of Summons attached.

Very truly yours,



Terry J. Cullinan
P.O. Box 2725
Missoula, MT 59806

Co-Applicant/Inventor

TJC\rhc:7015L16

1 Timothy D. Geiszler
2 GEISZLER & NEWCOMER, PLLP
3 Terrace West, Suite K
4 Missoula, Montana 59802
5 406/728-4950
6 Attorneys for Plaintiff

John S. Henson

7 MONTANA FOURTH JUDICIAL DISTRICT COURT, MISSOULA COUNTY

8 TERRY J. CULLINAN,

Dept. No. DEPT. No. 2
Cause No. 85259/2

9 Plaintiff,

10 vs.

11 MAX WEISS,

12 Defendant.

13 SUMMONS

14 THE STATE OF MONTANA TO THE ABOVE NAMED DEFENDANT:

15 YOU ARE HEREBY SUMMONED to answer the Complaint in this
16 action which is filed in the office of the clerk of this court, a
17 copy of which is now served upon you, and to file your answer and
18 serve a copy thereof upon the Plaintiff's attorney within 20 days
19 after the service of this Summons, exclusive of the day of
service; and in case of your failure to appear or answer,
judgment will be taken against you by default for the relief
demanded in the Complaint.

20 WITNESS my hand and the seal of said court, this 8th day of
August, 1997.

KATHLEEN D. BREUER, Clerk of Court

(Court Seal)

24 By: L. Carlson

Deputy

25 7015P2

26
27
28 SUMMONS

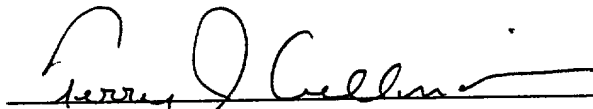
CERTIFICATE OF MAILING

I hereby certify that on March 12, 1998, I placed into priority mails with Federal Express, Co., duplicate originals of the following:

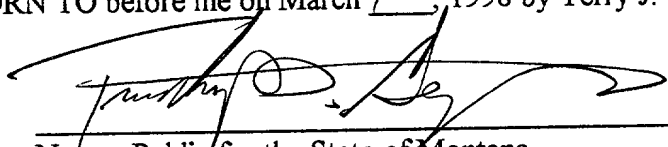
New Utility Patent Application Transmittal
 Declaration of Patent Application
 Verified Statement Claiming Small Entity Status; and,
 Supporting Documents

One original set of those documents with supporting attachment, including this Certificate of Mailing constitute 30 pages.

DATED March 12, 1998.


 Terry J. Cullinan

SUBSCRIBED AND SWORN TO before me on March 12, 1998 by Terry J. Cullinan.


 Notary Public for the State of Montana
 [My commission expires: July 8, 1999]

(SEAL)

FedEx USA Airbill

5289109545

001722589 2 **FedEx Billing Copy**

1 From 1031-0567-6
 Date 3/12/98 Sender's FedEx Account Number
 Sender's Name Timothy D. Geiszler Phone 406 728-4950
 Company GEISZLER & NEWCOMER PLLP Dept./Floor/Suite/Room
 Address 619 SW HIGGINS STE K
 City MISSOULA State MT Zip 59803
2 Your Internal Billing Reference Information Cullinan 7015
3 To
 Recipient's Name Assistant Commissioner Phone (703) 308-1202
for Patent Application Dept./Floor/Suite/Room
 Company Patent and Trademark Office
 Address 2011 S. Clark, Room 1 B03
 City Arlington State VA Zip 22202
 For **HOLD at FedEx Location** check here
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 3 ☐ (Extra Charge. Not available to all locations) (Not available with FedEx First Overnight or FedEx Standard Overnight)

4a Express Package Service Packages under 150 lbs. Delivery commitment: be later in some
 1 ☒ FedEx Priority Overnight (Next business morning) 5 ☐ FedEx Standard Overnight (Next business afternoon) 3 ☐ FedEx 2Day* (Second business day)
 6 ☐ NEW FedEx First Overnight (Earliest next business morning delivery to select locations) (Higher rates apply) * FedEx Letter Rate not available Minimum charge: One pound FedEx 2Day
4b Express Freight Service Packages over 150 lbs. Delivery commitment: be later in some
 7 ☐ FedEx Overnight Freight (Next business-day service for any distance) 8 ☐ FedEx 2Day Freight (Second business-day service for any distance) 9 ☐ FedEx Express Saver Freight (Up to 3 business-day service based upon distance)
 (Call for delivery schedule. See back for detailed descriptions of freight products.)
5 Packaging 6 ☐ FedEx Letter (Declared value limit \$500) 2 ☐ FedEx Pak 3 ☐ FedEx Box 4 ☐ FedEx Tube 1 ☐
6 Special Handling
 Does this shipment contain dangerous goods? 4 ☐ Yes (As per attached Shipper's Declaration) ☐ Yes (See back for details)
 6 ☐ Dry Ice (Dry Ice, 9, UN 1845 III) x kg. 904 CA ☐ Cargo Aircraft (Dangerous Goods Shipper's Declaration not required)
7 Payment Obtain Recipient's FedEx Account
 Bill to: 1 ☒ Sender (Account no. in section 1 will be billed) 2 ☐ Recipient (Enter FedEx account no. or Credit Card no. below) 3 ☐ Third Party 4 ☐ Credit Card 5 ☐ Other
 FedEx Account No. _____ Exp. Date _____
 Credit Card No. _____
 Total Packages _____ Total Weight _____ Total Declared Value* \$ _____ Total Charge \$ _____
 *When declaring a value higher than \$100 per shipment, you pay an additional charge. See SERVICE CONDITIONS, DECLARED VALUE AND LIMIT OF LIABILITY section for further information.
8 Release Signature

Your signature authorizes Federal Express to deliver this shipment without obtaining a signature and agrees to indemnify and hold harmless Federal Express from any resulting claims.

272

WCSL
 Rev. 2
 04/97